

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application. An identifier indicating the status of each claim is provided.

Listing of Claims

1-12. (Canceled)

13. (Currently Amended) A wireless communication system comprising:

a number of actuators each having one or more antenna associated therewith and being adaptable to be located on or within an element and being adaptable for causing said element to deform in a desired manner when actuated;~~and~~

control transceiver means, operable to communicate in a wireless manner with said number of actuators, for supplying a modulated command signal to at least one antenna;

whereby, in response to said modulated command signal, material characteristics of the respective actuator or actuators cause said modulated command signal to be demodulated without the use of any active electronic devices, whereupon said element is enabled to achieve the desired deformation; and

communications means for communicating said modulated command signal between a controlling base unit and at least one of said number of actuators, which includes a substrate portion having non-linear material characteristics in order to transmit said modulated command signal.

14-18. (Canceled)

19. (Previously Presented) The wireless communication system according to claim 13, wherein each said antenna is a micro-strip type antenna.

20-24. (Canceled)

25. (Currently Amended) A system for monitoring and/or deforming a structure in a desired manner, said system comprising:

a number of devices each including at least ~~one~~ of a sensor and an actuator, each having one or more antenna associated therewith and being adaptable to be located on or within said structure, in which each said sensor is adaptable for monitoring at least one predetermined characteristic of said structure and each said actuator is adaptable for causing said structure to deform in said desired manner when actuated; ~~and~~

control means for transmitting a command signal to at least one antenna in a wireless manner;

whereby, in response to said command signal, (i) the respective sensor or sensors and the at least one antenna associated therewith generate by use of electromagnetic coupling therebetween a characteristic signal indicative of a detected respective characteristic or characteristics and modulate the same without the use of any active electronic devices so as to obtain an output signal and transmit said output signal and (ii) the respective actuator or actuators cause said structure to deform in said desired manner; and

communications means for communicating said command signal between a controlling base unit and said at least one sensor and actuator, which includes a substrate portion having non-linear material characteristics in order to transmit said command signal and a sensing

signal.

26. (Previously Presented) The system according to claim 25, wherein each said antenna is a micro-strip type antenna.

27. (Canceled)

28. (Currently Amended) A system for causing a structure to be deformed in a desired manner, said system comprising:

a number of sensors each having one or more micro-strip type antenna associated therewith and being adaptable to be located on or within said structure and being adaptable for measuring at least one predetermined characteristic of said structure without the use of any active electronic devices;

a number of actuators each having one or more micro-strip type antenna associated therewith and being adaptable to be located on or within said structure and being adaptable for causing said structure to deform in said desired manner when actuated;

control means for transmitting a microwave signal in a wireless manner to a desired number of said sensors, wherein, in response thereto, the respective sensor or sensors and the at least one antenna associated therewith generate by use of electromagnetic coupling therebetween a characteristic signal indicative of a detected respective characteristic or characteristics; and

means for processing each said characteristic signal and for supplying each processed signal to appropriate one or ones of the actuators so as to actuate the same and cause

said structure to deform in said desired manner; and

communication means for communicating said microwave signal between a
controlling base unit and at least one of said number of sensors and at least one of said number of
actuators, which includes a substrate portion having non-linear material characteristics in order
to transmit said microwave signal and a sensing signal.

29. (Currently Amended) AThe system as in claim 28, wherein said control means includes transceiver means for communicating in a wireless manner with each sensor and actuator.

30. (Currently Amended) AThe system as in claim 29, wherein said transceiver means communicates with each said sensor and said actuator over a microwave frequency range.

31. (Currently Amended) AThe system as in claim 28, wherein the processing means is located on or within said structure.

32. (Currently Amended) AThe system as in claim 28, wherein the processing means is not located on or within said structure and wherein said processing means transmits each said processed signal to the appropriate one or ones of the actuators in a wireless manner.

33. (Currently Amended) AThe system as in claim 28, wherein at least one of said number of sensors and said number of actuators includes only passive electronic devices.

34. (Canceled)

35. (Currently Amended) ~~A~~The system as in ~~claim 34~~ claim 28, wherein said substrate portion is a piezoelectric ceramic material.

36. (Currently Amended) ~~A~~The system as in claim 28, wherein the at least one predetermined characteristic includes at least one of strain, acceleration, deformation, and pressure.

37. (Currently Amended) An element for use in a system for monitoring and/or deforming a structure in a desired manner, said element having at least one antenna associated therewith and being adaptable to be located on or within said structure and being adaptable to operate as ~~at least one of~~ a sensor device ~~and~~ or an actuator device, in which said element monitors at least one predetermined characteristic of said structure when operating as a sensor device and in which said element causes said structure to deform in said desired manner when operating as an actuator, and, in which a signal is transmitted to said element in a wireless manner so as to activate the antenna thereof and enable said element to monitor the at least one predetermined characteristic of said structure when operating as a sensor device and enable said element to cause said structure to deform in said desired manner when operating as an actuator, wherein said element is adaptable to operate simultaneously as a sensor device and an actuator device, wherein the antenna is a micro-strip type antenna and wherein said element includes a grating layer,

wherein said sensor device or said actuator device includes a substrate portion
having non-linear material characteristics in order to transmit said signal.

38-39. (Canceled)

40. (Currently Amended) ~~An~~The element as in claim 37, wherein said element includes only passive electronic devices.

41. (Currently Amended) ~~An~~The element as in claim 37, further having a protective cover layer and a substrate having a slot and a feedline.

42. (Currently Amended) ~~A~~The system as in claim 26, wherein at least one of said number of devices includes a protective cover layer and a substrate having a slot and a feedline.

43. (Currently Amended) ~~A~~The system as in claim 28, wherein at least one of said number of sensors and said number of actuators includes a protective cover layer and a substrate having a slot and a feedline.

44-48. (Canceled)

49. (Currently Amended) An element for use in a system for monitoring and/or deforming a structure in a desired manner, said element having at least one antenna

associated therewith and being adaptable to be located on or within said structure and being adaptable to operate as ~~at least one of~~ a sensor device ~~and~~ or an actuator device, in which said element monitors at least one predetermined characteristic of said structure when operating as a sensor device and in which said element causes said structure to deform in said desired manner when operating as an actuator, and, in which said element is operable to receive a signal transmitted thereto in a wireless manner to activate the antenna thereof and enable said element to monitor the at least one predetermined characteristic of said structure when operating as a sensor device and enable said element to cause said structure to deform in said desired manner when operating as an actuator, wherein the antenna is a micro-strip type antenna and wherein said element includes a grating layer,

wherein said sensor device or said actuator device includes a substrate portion having non-linear material characteristics in order to receive said signal.

50. (Currently Amended) ~~A~~The system as in claim 28, wherein the non-linear material characteristics of the substrate portion causes modulation or demodulation of the received signal from the RF signal.

51. (Previously Presented) The wireless communication system according to claim 13, wherein said control transceiver means communicates with the actuator or actuators over a microwave frequency range.

52. (Previously Presented) The system according to claim 25, wherein said control means communicates with each said device over a microwave frequency range.

53. (Currently Amended) A wireless communication system comprising:
a number of sensors each having an antenna and being located on or within an element, each sensor being adaptable to detect at least one respective predetermined characteristic of said element;~~and~~

control transceiver means, operable to communicate in a wireless manner with said number of sensors, for supplying a signal to a desired number of said sensors so as to activate each respective antenna thereof,

wherein, in response to the received signal, the desired number of sensors are enabled to detect the respective at least one predetermined characteristic and, due to material characteristics thereof, to cause a modulated output signal to be transmitted therefrom without the use of any active electronic devices indicative of the detected respective at least one characteristic to said control transceiver means; and

communications means for communicating said signal between a controlling base unit and at least one of said number of sensors, which includes a substrate portion having non-linear material characteristics in order to transmit said signal to said at least one sensor and a sensing signal from said at least one sensor.

54. (Previously Presented) The wireless communication system as in claim 53, wherein one or more of said number of sensors includes only passive electronic devices.

55. (Canceled)

56. (Currently Amended) The wireless communication system as in ~~claim 55~~

claim 53, wherein said substrate portion is a piezoelectric ceramic material.

57. (Previously Presented) The wireless communication system as in claim 53, wherein the at least one predetermined characteristic includes one or more of the following items: strain, acceleration, deformation, and pressure.

58. (Previously Presented) The wireless communication system as in claim 53, wherein said control transceiver means communicates with each said sensor over a microwave frequency range.

59. (New) The wireless communication system as in claim 13, wherein said substrate portion is a piezoelectric ceramic material.

60. (New) The system according to claim 25, wherein said substrate portion is a piezoelectric ceramic material.

61. (New) The element as in claim 37, wherein said substrate portion is a piezoelectric ceramic material.

62. (New) The element as in claim 49, wherein said substrate portion is a piezoelectric ceramic material.